

CLAIMS

1. A method of heavy particle separation, including a primary separation stage which includes the steps of dropping, accumulating, concentrating and discharging of heavy particles and/or a secondary separation stage for concentrating heavy particles which includes the steps of infeeding, stilling and retaining such particles.
2. A method as claimed in claim 1, including a preliminary separation stage.
3. A method as claimed in claim 2, including the steps of adding water to the feed material, scrubbing, size classification and transportation to the primary separation stage.
4. A method as claimed in either claim 2 or claim 3, including a differential transportation step designed to separate heavy, medium and light particles before introduction to the primary separation stage.
5. A method as claimed in any one of the preceding claims, in which particles including heavy particles are transported between the dropping, accumulating and concentrating steps in the primary separation stage.

6. A method as claimed in any one of the preceding claims, in which heavy particles are discharged from the accumulation zone and collected or fed to the secondary separation stage.
7. A method as claimed in any one of the preceding claims, in which particles from the discharge zone are collected or fed to the secondary separation stage.
8. A method as claimed in any one of the preceding claims, in which particles discharged from the discharge zone are separated into a leading section, a central section, and a trailing section before being collected or fed to the secondary separation stage.
9. A method as claimed in any one of the preceding claims, in which particles including heavy particles are transported between the infeeding, stilling and retaining steps of the secondary separation stage.
10. A heavy particle separation apparatus, including a tiltable transverse belt concavely shaped in its central area, and including a spiral rib having any suitable pitch provided on the belt outer surface, the rib being adapted to urge material upwardly along the transverse belt, a material feeder means provided above the transverse belt and a water spray system also provided above the transverse belt.

11. An apparatus as claimed in claim 10, including a plurality of idler rollers adjustable in a vertical direction to provide any desired profile for the conveyor belt.
12. An apparatus as claimed in either claim 10 or claim 11, including a classification system to provide the material feeder means with material smaller than about 2.5cm.
13. An apparatus as claimed in any one of claims 10 to 12, wherein the material feeder means includes a feed conveyor belt and/or sloping chute so that it provides an even differential feed of material to the transversely operated transverse belt.
14. An apparatus as claimed in claim 13, the material feeder means being provided above the transversely operated transverse belt and near one side thereof.
15. An apparatus as claimed in claim 14, wherein the water spray system is provided above and near the opposite side of the transversely operated transverse belt to the material feeder means.

16. An apparatus as claimed in any one of claims 10 to 15, in which the rib is replaced by a groove having any suitable pitch and/or the belt surface has any suitable texture.
17. An apparatus as claimed in any one of claims 10 to 16, therein the rib or groove, as applicable, has a suitable varying pitch along its length.
18. An apparatus as claimed in anyone of claims 10 to 17, wherein the rib or groove, as applicable, has a suitable varying height or depth respectively, along its length.
19. An apparatus as claimed in any one of claims 10 to 18, including a suitable tailings trough at the lower end of the transversely operated transverse belt and a suitable concentrate trough at the upper end thereof.
20. An apparatus as claimed in claim 19, wherein the concentrate trough leads to a secondary separation means including a suitable sluice box to separate fine heavy material.
21. An apparatus as claimed in any one of claims 10 to 20, including retaining or retention modules mounted on a suitable conveyer means and being removable in continuous fashion for collection of heavy particles.

22. A method of separating heavy particles, including the step of using an apparatus as claimed in any one of claims 10 to 21.